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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,464	10/07/2003	Kenshi Kanegae	740819-1030	5297
22204	7590	10/15/2004		
NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128			EXAMINER CHEN, KIN CHAN	
			ART UNIT 1765	PAPER NUMBER

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/679,464

Applicant(s)

KANEGAE ET AL.

Examiner

Kin-Chan Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/837,556.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>100703</u> . | 6) ☐ Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 5, line 7, "z.0" is vague and indefinite. For the patent examining purpose, the examiner assumes that it is $z > 0$.

Double Patenting

2. Claims 1-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 and 13, 14 of U.S. Patent No. US 6,632,746. Although the conflicting claims are not identical, they are not patentably distinct from each other because US 6,632,746 discloses an etching method for plasma etching an organic / inorganic hybrid film having low dielectric constant with same formula and using same etchants.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka (US 6,124,154) in view of JP407074245A or Sukharev (US 6,506,678).

In a method of etching, Miyasaka teaches etching an organic / inorganic hybrid film represented by $\text{SiC}_x\text{H}_y\text{O}_z$ (so-called forming an oxide layer with an organic silane). The etching gas may contain fluorine, carbon, and nitrogen (col. 24, lines 66 through col. 25, line 5; col. 32, lines 27-35). Miyasaka does not explicitly state that the oxide layer formed with an organic silane may be of low dielectric constant. In a method of forming low k dielectric material, JP407074245A or Sukharev (US 6,506,678; col. 7, lines 58-63 and col. 2, lines 1-8, an excerpt of the article by L. Peters, September 1998) discloses that organic silane may be used to form a low k dielectric material (e.g., oxide), hence, it would have been obvious to one with ordinary skill in the art that the oxide formed with an organic silane may be of low dielectric constant.

Claim 3 differs from the combined prior art by specifying various compositions (the carbon content in the film) of the organic / inorganic hybrid film that is subjected to etching. However, JP407074245A or Sukharev teaches that the organic / inorganic hybrid film is low dielectric constant material, the carbon content in the film is simply a

matter of choice of design depending on the product requirement. It would have been obvious to one with ordinary skill in the art to change the compositions and concentration of the precursors to meet specific product requirement through routine experimentation.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (US 5,814,563; hereinafter "Ding") in view of Yamazaki et al. (US 6,228, 751; hereinafter "Yamazaki") in view of JP407074245A or Sukharev (US 6,506,678).

In a method of etching a dielectric (insulating) layer, Ding teaches using an etching gas containing fluorine, carbon, nitrogen and CO or CO₂ (abstract; col. 3, lines 1-4). Ding does not limit to the dielectric (insulating) layer being etched in its process. In a method of forming various types of insulating films in semiconductor device fabrication, Yamazaki teaches that an organic / inorganic hybrid film represented by SiC_xH_yO_z (so-called oxide formed using organic silane) may be formed and effectively used in semiconductor device fabrication (col. 16, lines 29-35; col. 21, lines 50-53). Hence, it would have been obvious to one with ordinary skill in the art to use the insulating film of Yamazaki in the process of Ding because Yamazaki discloses that it may be used effectively in semiconductor device fabrication. The combined prior art do not explicitly state that the oxide layer formed with an organic silane may be of low dielectric constant. In a method of forming low k dielectric material, JP407074245A or Sukharev (US 6,506,678; col. 7, lines 58-63 and col. 2, lines 1-8, an excerpt of the article by L. Peters, September 1998) discloses that organic silane may be used to form a low k dielectric material (e.g., oxide), hence, it would have been obvious to one with

ordinary skilled in the art that the oxide formed with an organic silane may be of low dielectric constant.

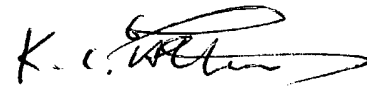
Claims 3 and 6 differ from the combined prior art by specifying various compositions (the carbon content in the film) of the organic / inorganic hybrid film that is subjected to etching. However, JP407074245A or Sukharev teaches that the organic / inorganic hybrid film is low dielectric constant material, the carbon content in the film is simply a matter of choice of design depending on the product requirement. It would have been obvious to one with ordinary skilled in the art to change the compositions and concentration of the precursors to meet specific product requirement through routine experimentation.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

October 14, 2004



Kin-Chan Chen
Primary Examiner
Art Unit 1765

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